

CLAIMS

We Claim:

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1. An apparatus for producing parts, comprising:
a tool comprising complementary punch and die;
a die holder for supporting the die;
a punch guide having a shaft for guiding the punch in relation to the die, wherein the shaft
10 is sized and shaped to receive the punch in slidable contact; and
an interface capable of mechanically interfacing force from a press with the punch in a
manner whereby the punch is structurally decoupled from the press.

2. The apparatus of claim 1, wherein the die holder includes a pocket for nesting the
15 mating surface of the die in confronting orientation with the mating surface of the punch.

3. The apparatus of claim 2, further comprising a backup plate attachable to the die
holder over the pocket for securing the die within the pocket.

20 4. The apparatus of claim 1, further comprising a spacer disposed between the die holder
and the punch guide, such that a workspace is defined between the die holder and punch guide
where the punch engages with the die to produce the part.

25 5. The apparatus of claim 4, wherein the punch guide, the die holder and the spacer are
provided as a unitary structure.

6. The apparatus of claim 1, wherein the punch guide, the die holder and the spacer are
provided as a monolithic structure.

7. The apparatus of claim 1, further comprising a stop disposed between the press and the punch, along a stroke path of the press, for limiting the translation of the punch through the shaft.

5 8. The apparatus of claim 1, further comprising a stop disposed along a stroke path of the punch, for limiting the translation of the punch through the shaft.

9. The apparatus of claim 8, wherein the punch includes a catch adapted to engage the stop, such that when the catch engages the stop, the stop limits further translation of the punch
10 towards the die.

10. The apparatus of claim 1, further comprising biasing means coupled to the punch, the biasing means being biased when the punch translates towards the die under the force of the press, the biasing means being capable of moving the punch away from the die when the force is
15 removed.

11. A system for producing parts, comprising:

a press having a press bed and a press ram;

at least one stamping station supported on the press bed for supporting complementary
20 punch and die, each stamping station comprising:

a die holder for supporting the die;

a punch guide having a shaft for guiding the punch relative to the die, wherein the shaft is sized and shaped to receive the punch in slidable contact; and

an interface capable of mechanically coupling force from the press ram with the punch in
25 a manner whereby the punch is structurally decoupled from the press ram.

12. The system of claim 11, wherein the interface comprises a ball attached to the punch and a socket attached to the press ram, wherein when ball engages the socket, the press ram is capable of coupling the force from the press ram to the punch, but being structurally decoupled
30 from the punch.

13. The system of claim 11, wherein the interface comprises a ball attached to the press ram and a socket attached to the punch, wherein when ball engages the socket, the press ram is capable of coupling the force from the press ram to the punch, but being structurally decoupled from the punch.

14. The system of claim 11, wherein the interface comprises:
an adapter plate coupled to the press, the adapter plate being disposed within the shaft between the punch and the press, wherein the adapter plate is capable of translating longitudinally along the shaft towards and away from the punch; and
a valve for supplying the shaft with low-pressure hydraulic fluid;
wherein when the adapter plate translates towards the punch holder, a uniform, unidirectionally orthogonal force is exerted on the punch to move the punch towards the die.

15. The system of claim 14, wherein the valve is located between the adapter plate and the punch, the adapter plate being capable of closing the valve when the adapter plate engages the valve as the adapter plate translates towards the punch.

16. The system of claim 15, further comprising a working pressure relief valve coupled to the shaft for actively controlling the force exerted on the punch for producing the part.

17. The system of claim 16, further comprising a stop pressure relief valve coupled to the shaft for actively controlling a maximum force exerted on the punch.

18. The system of claim 14, further comprising a stop block located between the punch and the die holder, the stop block being capable of inhibiting translation of the punch towards the die holder when the punch holder contacts the stop block.

19. The system of claim 18, further comprising a spacer disposed between the die holder and the stop block for positioning the stop block relative to the die holder.

20. The system of claim 14, wherein the interface further comprises a ball attached to the actuator plate and a socket attached to the press ram, wherein when ball engages the socket, the press ram is capable of coupling the force from the press ram to the actuator plate, but being structurally decoupled from the actuator plate.

21. The system of claim 11, further comprising means for in-line machining a work piece before it enters the stamping station.

22. The system of claim 11, further comprising a locating subplate having indexing features adapted to receive the stamping stations and to align the stamping stations relative to each other.

23. The system of claim 22, wherein the indexing features comprise grooves machined on a surface of the subplate.

24. A system for producing parts having tolerances within 1000 nanometers, comprising:
a press having a press bed and a press ram;
at least one stamping station supported on the press bed for supporting complementary punch and die, each stamping station comprising:
a die holder for supporting the die;
a punch guide having a shaft for guiding the punch relative to the die, wherein the shaft is sized and shaped to receive the punch in slidable contact;
an interface capable of mechanically coupling force from the press ram with the punch in a manner whereby the punch is structurally decoupled from the press ram;
a locating subplate having indexing features adapted to receive the stamping stations and to align the stamping stations relative to each other; and
means for in-line machining a work piece before it enters the stamping station.

25. A process for producing parts, comprising the steps of:
providing a stamping system that is configured to produce parts having tolerances within
1000 nanometers; and
5 stamping parts using the stamping system.

26. A part produced by the process of claim 25.

27. The part of claim 26, wherein the part is an optoelectronic part.

10 28. The part of claim 27, wherein the optoelectronic part is sized and shaped to support an
optical fiber.